

Schedule

Week 1 (09/07-9/11)

- Day 1
 - Introduction to Theory of Computation¹
 - Introduction to OCAML²
 - Assignment 1³
- Day 2
 - OCAML basics⁴
- Day 3
 - OCAML basics (cont)⁵
- Day 4
 - OCAML basics (cont)⁶
 - OCAML example: sets as lists (optional)⁷

Week 2 (09/14-09/18)

- Day 1
 - Alphabets, strings, substrings, empty string, lexicographic ordering⁸
 - Alphabet and friends in OCAML⁹
 - Assignment 2¹⁰
- Day 2
 - Languages, examples, constructions¹¹
- Day 3
 - Languages, examples, constructions¹²
- Day 4
 - Deterministic Finite Automata¹³

¹[notes/theory_intro.html](#)

²[notes/ocaml_intro.html](#)

³[assignments/1.html](#)

⁴[notes/ocaml_basics.html](#)

⁵[notes/ocaml_basics.html](#)

⁶[notes/ocaml_basics.html](#)

⁷[notes/ocaml_sets.html](#)

⁸[notes/alphabet.html](#)

⁹[notes/ocaml_alphabet.html](#)

¹⁰[assignments/2.html](#)

¹¹[notes/languages.html](#)

¹²[notes/languages.html](#)

¹³[notes/fin_aut_dfa.html](#)

Week 3 (09/21-09/25)

- Day 1
 - Deterministic Finite Automata (cont)¹⁴
- Day 2
 - DFAs in OCAML¹⁵
- Day 3
 - Regular Languages¹⁶
 - Union of regular languages is regular¹⁷
- Day 4
 - Implementation of union in OCAML¹⁸
 - Assignment 3¹⁹

Week 4 (09/28-10/02)

- Day 1
 - Non-deterministic automata, examples²⁰
 - Implementation in OCAML
- Day 2
 - DFA equivalent to an NFA²¹
- Day 3
 - Regular Expressions²²
 - RegEx -> NFA
- Day 4
 - Nonregular languages and the Pumping Lemma²³
 - Assignment 4²⁴
 - Catching up

¹⁴[notes/fin_aut_dfa.html](#)

¹⁵[notes/ocaml_dfa.html](#)

¹⁶[notes/fin_aut_dfa.html](#)

¹⁷[notes/fin_aut_dfa.html](#)

¹⁸[notes/ocaml_dfa.html](#)

¹⁹[assignments/3.html](#)

²⁰[notes/fin_aut_nfas.html](#)

²¹[notes/fin_aut_nfas.html](#)

²²[notes/regexp.html](#)

²³[notes/nonregular.html](#)

²⁴[assignments/4.html](#)

Week 5 (10/05-10/09)

- Day 1
 - Lexers²⁵
- Day 2
 - Review
- Day 3
 - Midterm 1 (study guide²⁶)
- Day 4
 - Context Free Grammars²⁷
 - Examples of derivations
 - Ambiguous grammars

Week 6 (10/12-10/16)

- Day 1
 - Programming examples of CFGs
 - Chomsky Normal Forms²⁸
- Day 2
 - Pushdown Automata definition²⁹
- Day 3
 - PDAs more examples
- Day 4
 - CFG \rightarrow PDA³⁰

Week 7 (10/19-10/23)

- Day 1
 - Fall Break
- Day 2

²⁵[notes/lexers.html](#)

²⁶[notes/midterm1_study_guide.html](#)

²⁷[notes/cfg.html](#)

²⁸[notes/cfg.html](#)

²⁹[notes/pushdown_automata.html](#)

³⁰[notes/cfg_pda.html](#)

- Pumping lemma for CFGs³¹
 - Non-context-free grammars
- Day 3
 - Basics of Parsing, First/Follow sets³²
- Day 4
 - Basics of Parsing, First/Follow sets³³
 - Assignment 5³⁴

Week 8 (10/26-10/30)

- Day 1
 - Basics of Parsing, LL(k) parsers³⁵
- Day 2
 - Basics of Parsing, LR(k) parsers³⁶
- Day 3
 - Basics of Parsing, LR(k) parsers³⁷
- Day 4
 - Turing Machines³⁸
 - Assignment 6³⁹

Week 9 (11/02-11/06)

- Day 1
 - Turing Machines, examples⁴⁰
- Day 2
 - Multitape / Nondeterministic Turing machines⁴¹
- Day 3

³¹[notes/pumping_cfg.html](#)

³²[notes/parsing.html](#)

³³[notes/parsing.html](#)

³⁴[assignments/5.html](#)

³⁵[notes/parsing.html](#)

³⁶[notes/parsing.html](#)

³⁷[notes/parsing.html](#)

³⁸[notes/turing.html](#)

³⁹[assignments/6.html](#)

⁴⁰[notes/turing.html](#)

⁴¹[notes/turing.html](#)

- Multitape / Nondeterministic Turing machines⁴²
- Day 4
 - Decidable Problems, Regular Languages⁴³
 - Assignment 7⁴⁴

Week 10 (11/09-11/13)

- Day 1
 - Decidable Problems, CFLs⁴⁵
- Day 2
 - Catching up
- Day 3
 - Midterm 2 (study guide⁴⁶)
- Day 4
 - The Halting Problem⁴⁷

Week 11 (11/16-11/20)

- Day 1
 - Assignment 8⁴⁸
 - Undecidability of Halting Problem
- Day 2
 - Reducibility
- Day 3
 - Regularity of languages is undecidable
- Day 4
 - Time Complexity classes

⁴²[notes/turing.html](#)

⁴³[notes/decidable.html](#)

⁴⁴[assignments/7.html](#)

⁴⁵[notes/decidable.html](#)

⁴⁶[notes/midterm2_study_guide.html](#)

⁴⁷[notes/halting.html](#)

⁴⁸[assignments/8.html](#)

Week 12 (11/23-11/27)

- Day 1
 - The class P
- Day 2
 - Thanksgiving Break
- Day 3
 - Thanksgiving Break
- Day 4
 - Thanksgiving Break

Week 13 (12/01-12/04)

- Day 1
 - The class NP
- Day 2
 - P vs NP, NP-complete problems
- Day 3
- Day 4

Week 14 (12/07-12/11)

- Day 1
- Day 2
- Day 3
- Day 4